

Sacred Heart University

From the Selected Works of Robert McCloud

May, 2013

Factors in Mobile Game Design

Robert McCloud, *Sacred Heart University*

FACTORS IN MOBILE GAME DESIGN

Robert McCloud¹, Ardiana Sula² and Carrie A. Picardi³

¹Sacred Heart University
Fairfield, Connecticut, USA
mccloudr@sacredheart.edu
[Polytechnic University of Tirana](#)
[Ph.D Student](#)

ardianasula@gmail.com
³University of Bridgeport
Bridgeport, Connecticut, USA
cpicardi@bridgeport.edu

Abstract

Mobile is the fastest growing area for computer gaming. Fueled by the every growing sales of handheld devices, the increasing comfort of gamers with their devices, larger screens and availability of casual games, mobile games offer the developer an area of rapid growth. In this paper we report on the commencement of research that attempts to identify the key development concepts for a mobile game. Gamers' locus of control is examined to determine the extent to which this personality trait impacts both interest level and type of game. We consider two mobile games, Grand Theft Auto and Edge, in an attempt to isolate the important design characteristics for this medium.

Keywords: *mobile, locus of control, Grand Theft Auto, Edge, computer games*

1.Introduction

Mobile gaming crept up on us. Looking around, one may observe people were taking out their cell phones and opening up a game to pass the time while waiting for coffee at Starbucks, sitting in a restaurant before one's dining partner arrives, waiting for a train or any of the daily mundane tasks that require individuals to wait for various periods of time.

Observing this behavior, game developers and researchers concluded that mobile games should be designed to focus on short play bursts. Further, they should have simple graphics, intuitive controls, and input functions that accommodate the small screen size.

While the initial conclusions were being discussed and acted upon, something happened to the hardware: its screen size and power grew. It also became increasingly popular to set up gaming networks.

Handheld gaming took another direction. The very young (under 14) age group emerged as those who were the most comfortable with handheld devices. To the college student participating in a gaming study there was a startling new awareness: she was no longer the young generation. For mobile games there is a new set of players, younger and more facile than their older brothers and sisters. We mention this situation because it became increasingly obvious during our initial research. It also offers a fruitful area for the future.

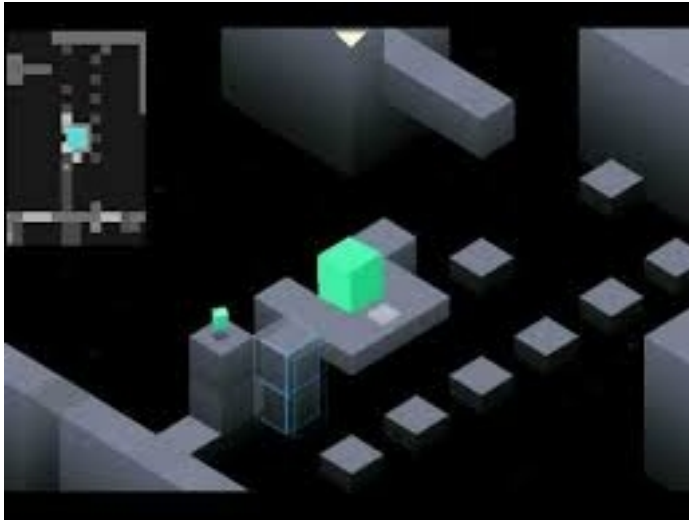
Recognizing that a computer game's appeal to a certain extent depends on the personality of the player we decided to first examine players' locus of control. The concept of locus of control was introduced by Julian Rotter (1966) and has been studied across myriad contexts in an effort to understand individual beliefs in the connection between personal effort and outcomes. Who controls your behavior? Are you the master of your own domain? Is your life already predetermined and everything that happens is fated?

A person with an external locus of control is more likely to believe that his or her fate is determined by chance or outside forces that are beyond their own personal control. This strategy can be healthy sometimes, for example, when coping with a natural disaster. However, it can also be harmful in that it can lead to feeling of helplessness and loss of personal control. Internal locus of control is quite different. Who controls your behavior? Are you the master of your own domain? Is your life already predetermined and everything that happens is fated? If you believe that you control your own destiny and that your behaviors are under your control, then you have an internal locus of control. This concept has quite a bit of importance when we try to make attributions for our behaviors. For example, if you did well on an exam, how would you explain it? If you said that your success was because you got lucky or that the teacher gave an easy exam, then you would be exhibiting an "external" locus of control. However, if you attribute your good performance to your hard work, good study habits, and interest in the topic, you would be exhibiting an internal locus of control.

We wanted to take a group of acknowledged gamers and determine whether they had internal or external locus of control. This question is an extremely interesting one. For example, gamers tend to have a high tolerance of failure. While learning a game, they are perfectly happy to be defeated, killed or otherwise eliminated. No problem, they simply restart the game. They seem to have no problem initially giving control to the game. However, as they continue to play, if they are to continue liking that particular game, a player will want to eventually assume control. What does this say about the gamer's personality?

The second part of our research aimed at determining those mobile game elements that are most important to an effective design. Since much mobile development today tends to be

adaptations of console or computer games, we chose two of the most successful: Edge and Grand Theft Auto: Vice City.



Edge requires digital dexterity.

Edge is a brightly colored puzzle game that depends on finger dexterity and ability to figure out puzzle paths. The player moves a soft-edged cube through geometric puzzle lanes. Successful completion of one puzzle brings you to the next of 48 total levels. It is forgiving, providing second chances and often giving subtle hints. Touch-screen sensitivity allows the player to press harder to move a cube up and over obstacles. It is highly intuitive, and works well in the puzzle-game mode of frequently starting over.



Grand Theft Auto: Vice City contains significant graphic detail.

Grand Theft Auto: Vice City is a relatively mature (first released in 2002) title that has high familiarity among experienced gamers. Its popularity could account for the fact that subjects tended to be comfortable with the mobile adaptation. It is part of an extended series of Grand Theft Auto games. They depend on detailed backstory, character empathy, and quick strategic decision-making.

The authors chose two games that both have high quality ratings. However, they are very different types of game play. Also, we theorized that a graphically simpler game (Edge) would be more appealing than a complex adventure (Grand Theft Auto: Vice City) on a mobile device.

Overall the research involved two distinct parts. The first was to see if experienced gamers tended to have an internal or external locus of control. In the second stage we identified, based on previous studies, what we thought were the key elements of a successful mobile game. We tested these elements on players who first played the game on a mobile device, than rated a series of factors on a five point Likert scale.

This paper constitutes preliminary report on the research. It is intended not as conclusive findings, but as a direction to further study.

2. Locus of Control

Because of their eventual need to control the outcome, we hypothesized that gamers with an internal locus of control would have significantly different responses than those with an external locus. That is not the case. In the table below we list the questions a player was asked to rate. None the eight factors came close to significance ($p = .05$). By a stretch, we might say there is a slight tendency in question 3, where the user is asked to rate the satisfaction of a short play session. As noted below, short play sessions are one of the eight factors researchers feel are important for a successful mobile game. Grand Theft Auto is heavily influenced by movies. Thus it has a story line that is less prone to frequent interruptions than is a puzzle game like Edge. However, even that was not enough to provide a significant result.

Q	Edge v. Grand Theft Auto: Vice City	Sig
1	This game's controls are intuitive.	.398
2	I am able to clearly read the screen.	.952
3	A short play session of this game is satisfying.	.174
4	I can easily resume this game after interruption.	.546
5	I am comfortable with this game's interface.	.320
6	Effective help is readily available.	.510
7	I can easily track my game status.	.721
8	The game's goal is clearly stated.	.829

Table 1: Locus of control analysis results.

Most likely we would look to the sample characteristics as a reason for the lack of significance. The experience, young male gamer simply more interested in game action than story line. Our sample size ($n = 25$) is skewed toward males between 21 and 30. In addition, our young males tended to be internal locus of control. Thus, when we examine how locus of control differentiates opinions of experience, we were looking at subjects who perhaps were predisposed to hold the same opinions. One problem we did not anticipate was that females actually would refuse to participate in our research. Our own personal non-systemic observation says that very young females (> 14 years) are more prone to be gamers than are their older counterparts. In future research we will look at the younger population to see if some of the differences in older subjects have faded.

3. Mobile Game Elements

Since we are ultimately trying to determine what design factors affect successful mobile games, we wanted to see what was the universe of possible factors. Our starting point was provided by Frank Bentley and Edward Bennett in their excellent book *Building Mobile Experiences*. With the help of Bentley and Bennett, we identified eight separate elements as keys to a successful mobile game. These correspond to the questions listed in Table 1 above. Listed below, in italics, are the statements that each person was asked to evaluate after playing either Grand Theft Auto: Vice City or Edge:

- *The games controls are intuitive.* Mobile game players do not want to figure out how to manipulate controls or to guess at what they do. Further, because of limited screen real estate, these controls have to be smaller than those of a console game.
- *I am able to clearly read screen.* This is not just a question of screen size. Mobile games are played under many different ambient lighting conditions. Screen readership poses a particularly difficult problem for mobile game designers.
- *A short play session of this game is satisfying.* Mobile game theory dictates that players tend to use their devices for short bursts of play. Typically they have a few minutes to kill. While this particular part of the theory might change as the young mobile gamers mature (and also as device screens continue to grow) current theory states that a short play session should provide a satisfying experience.
- *I can easily resume this game after interruption.* The interruption characteristic is connected to the short play session. Since the game is continuously interrupted, allowing the player to easily pick up where she left off makes for a smoother gaming experience.
- *I am comfortable with this game's interface.* Mobile game designers simply do not have as much real estate as computer or console designers. Their particular challenge is to make the interface immediately comfortable.
- *Effective help is readily available.* Although they might not want to admit it, even experienced gamers will need help. This is particularly true with the mobile game. Perhaps it has been purchased before a trip, or on a whim. The easily available, inexpensive nature of mobile gaming will probably lead players to continuously try new experiences. Even quick learners want access to help and play tips.
- *I can easily track my game status.* If you are going to have an interrupted gaming experience, you might not remember where you were at the last interruption. Thus it is particularly important to know where you stand in that particular game.
- *The game's goal is clearly stated.* Because of the mobile gamer's tendency to try new experiences, he is going to want to know each game's goal before beginning play. A well-designed game makes that goal clear at the beginning.

Because of download and installation difficulties there were different numbers of subjects for each game: Grand Theft Auto: Vice City $n = 34$; Edge $n = 39$. We felt, however, that each number was sufficient to produce credible results.

Reviewing each game, we theorized that there would be significant player reactions to at least some of our questions. Because of its simple, geometric, bright-color design we felt Edge's screen would be judged as more readable. Also, short play sessions would almost certainly be favorable to Edge, where a "session" could conceivably be viewed as moving a block from one spot to another. Comfort with the game's interface was another area where we theorized that

Edge might have an edge. We worried about how players would view the Grand Theft Auto screen size compression. Showing a digital city on a full-size screen is one thing. Redesigning the same detail to fit on a cell phone was something quite different.

This time we also simplified the experimental design by temporarily eliminating locus of control as a factor. All we looked for was to see if the players had *any* significant differences in the eight areas described above. There was not one game design factor that yielded a significant difference. This was true, even though the sample group was larger and more heterogeneous than the original group.

Q	Edge v. Grand Theft Auto: Vice City	Sig
1	This game's controls are intuitive.	.307
2	I am able to clearly read the screen.	.212
3	A short play session of this game is satisfying.	.339
4	I can easily resume this game after interruption.	.337
5	I am comfortable with this game's interface.	.195
6	Effective help is readily available.	.179
7	I can easily track my game status.	.138
8	The game's goal is clearly stated.	.228

Table 2: Test for significance with locus of control eliminated.

There was no significant difference. For this second test the sample group was larger in number and was also wider in age and gender. In addition we had participants from two cultures: the United States and India.

4. Future Research

When we enlarged the sample size, eliminated one variable and had a demographically more diverse population, seven of the eight factors moved toward significance. The only one that did not was the short play session.

With that in mind we view this paper as exploratory. We will continue the experiment with modifications. One way to go is to simplify and look at locus of control differences for one game at a time. Another is to see if there are cultural differences in responses. Still another is to expand the research to very young gamers to see if gender differences are so pronounced. Because mobile gaming continues to grow rapidly. This research area is worth exploring.

5. References

Bentley, Frank and Barrett, Edward. 2012. *Building Mobile Experiences*. Cambridge, MA. The MIT Press.

Bulkeley, William M. 2011. How Games Are Driving a Mobile Graphics Revolution. Cambridge, MA. MIT Technology Review.

Elias, George Skaff, Garfield, Richard, and Gutschera, Robert K. 2012. *Characteristics of Games*. Cambridge, MA. The MIT Press.

Korhonen, Hannu and Koivisto, Elina M. I. 2006. Playability Heuristics for Mobile Games. Tampere, Finland. Nokia Research Center.

Palen, Leuysia and Bodker, Susanne. 2008. Don't Get Emotional. Berlin. Springer-Verlag.

Regalado, Antonio. 2013. Mobile Computing Is Just Getting Started. Accessed April 11, 2013. <http://www.technologyreview.com/businessreport/making-money-in-mobile>.

Rotter, J. 1966. Generalized expectancies for internal versus external control of reinforcement. Ames, IA. Psychological Monographs: General and Applied, Vol 80(1), 1-28.

Surowiecki, James. 2006. In Praise of Third Place. New York, NY: The New Yorker Magazine.

Ventrice, Tony. 2009. The Four Perspectives of Game Design: Insight from the Mobile Fringe. Accessed April 09, 2013. http://www.gamasutra.com/view/483497/Tony_Ventrice.php.